AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1-7 (canceled).

8. (original): An apparatus for performing interworking between an ATM switch and a satellite modem of a gateway interconnecting a terrestrial ATM network and a satellite ATM network, said ATM switch being communicably linked to said terrestrial ATM network and said satellite modem being communicably linked to said satellite ATM network, the apparatus comprising:

a.   a congestion control unit for performing congestion control in the satellite network and back-pressuring terrestrial data traffic based on a current data traffic load in the satellite network;.

b. a demand-assigned multiple access (DAMA) control unit for allocating satellite bandwidth on demand to the gateway based on a current data traffic carried by the gateway;

c.   a cell delay variation removal unit for reducing cell delay variation on incoming data from the satellite network;

d.   a data encryption and decryption unit for performing encryption of data received from the terrestrial network, and decryption of received data from the satellite network; and

e.   a signal interworking unit for providing signaling interworking between a signaling protocol of the terrestrial network and a signaling protocol of the satellite network.

9. (original): The apparatus defined in claim 8, wherein the congestion control unit receives congestion messages from the satellite network via the satellite modem and regulates a rate of transmission of data to each satellite downlink beam from the satellite network.

10. (original): The apparatus defined in claim 8, further comprising;

a plurality of queues for each downlink satellite beam for each ATM class of service or each ATM virtual connection, wherein said congestion control unit regulates the rate of transmission of data to each satellite downlink beam by queuing data traffic received from the ATM switch in a corresponding one of said queues or by queuing traffic for each ATM virtual connection in a corresponding one of said queues; and

a traffic scheduler for monitoring queued traffic, a negotiated traffic guarantee for each ATM virtual connection, current congestion in each satellite downlink beam, and the total bandwidth available for transmission of traffic to the satellite, determining the rate of transmission of data traffic to each satellite downlink beam, guaranteeing a minimum rate based on the ATM traffic contract, regulating the rate of flow of excess traffic, using a separate one of said queues for multicast traffic, and controlling the rate of transmission of multicast traffic based on overall satellite system load.

11. (original): The apparatus defined in claim 8, wherein said congestion control unit regulates the flow of data traffic from the terrestrial network on a per-ATM virtual connection basis by using an Available Bit Rate (ABR) flow control mechanism.

12. (original): The apparatus defined in claim 8, wherein said congestion control unit regulates the flow of data traffic from the terrestrial network by setting an Explicit Congestion Notification (ECN) bit in Internet Protocol (IP) data packets transported in ATM virtual connections destined to congested satellite downlink beams.

13. (original): The apparatus defined in claim 8, wherein said congestion control unit regulates the flow of traffic by controlling an advertised receive window of TCP connections carried in ATM virtual connections destined to congested downlink beams.

14. (original): The apparatus defined in claim 8, wherein said congestion control unit regulates the flow of traffic by a implementing packet discard scheme.

15. (original): The apparatus defined in claim 14, wherein said packet discard scheme includes Early Packet Discard (EPD), Partial Packet Discard (PPD) or Random 5 Early Discard (RED).

3

16. (original): The apparatus defined in claim 8, wherein said DAMA unit requests bandwidth from a Network Control Center which manages network resources based on the current data traffic load at the gateway, receives bandwidth allocations from the Network Control Center, and provides the bandwidth allocations to said traffic scheduler.

17. (original): The apparatus defined in claim 16, wherein said DAMA unit informs the ATM switch of said gateway of bandwidth changes received from the Network Control Center so that the ATM switch limits the flow of data traffic to the satellite network, and informs the satellite modem of the allocated bandwidth so that the satellite modem transmits on correct radio frequencies at an appropriate time.

18. (original): The apparatus defined in claim 8, wherein said cell delay variation removal unit reduces cell delay variation by shaping data traffic received from the satellite network.

19. (original): The apparatus defined in claim 18, wherein said cell delay variation removal unit shapes data traffic based on parameters for each ATM virtual connection which are obtained by intercepting a virtual connection traffic descriptor which is exchanged between the ATM switch of the gateway and a Network Control Center during call setup.

20. (original): The apparatus defined in claim 8, wherein said cell delay variation removal unit reduces cell delay variation by introducing special Operations, Administration, and Maintenance (OAM) cells containing time stamps and using the time stamps to determine a time of arrival of ATM cells at the gateway.

21. (original): The apparatus defined in claim 8, wherein said a data encryption and decryption unit performs data encryption of data to be transmitted to the satellite system and decryption of data received from the satellite system, using a satellite-network-specific encryption scheme transparent to the ATM switch of the gateway.

22. (original): The apparatus defined in claim 21, wherein said a data encryption and decryption unit obtains key information for data security by intercepting call signaling information exchanged during call setup between the ATM switch of the gateway and a Network Control Center.

4

23. (original): The apparatus defined in claim 8, wherein said signal interworking unit provides interworking between terrestrial network signaling protocols and satellite network signaling protocols.

24. (original): The apparatus defined in claim 8, wherein signal interworking unit performs ciphering of signaling data within the satellite network.

25. (original): The apparatus defined in claim 8, wherein signal interworking unit provides authentication of the gateway within the satellite network.